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The great under-clothing question.

New Review

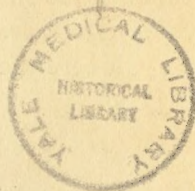
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THE GREAT UNDERCLOTHING QUESTION.

ANXIETY about underclothing is almost *fin-de-siècle* in its freshness. For obvious reasons it is not easy to be learned upon the innermost clothes of other days. Advertisements are at present as free in disclosure of underwear as of any other raiment, but it is probable that, even though the records of the past were equally unreserved, there would still be but little material for a chapter on underclothing. There was certainly some concern at times as to what should be worn next the skin. In the dark and unquestionably dirty days of old there was a common practice of wearing shirts which had been steeped in saffron water, so that they could be kept longer in use without washing. With a delicacy which can be gratefully recognised, Spenser states that saffron was thus used "for avoyding that evill which commeth of much sweating and longe wearing of linnen." Other considerations than comfort occasionally entered into the choice of clothing. There is an entirely delightful passage in Sir John Harrington's "Schoole of Salerne" which affords clear insight into seventeenth-century hygiene, and shows the course of early dress-reform. With all the air of an authority, he wrote: "In the summer-time I chiefly commend garments of Harts'-skinnnes and Calues'-skinnnes, for the Hart is a creature of long life, and resisteth poyson and Serpents; therefore I myself vse garments of the like sort for the winter season, also neverthesse lined with good linnen. Next I doe judge it not to be much amisse to vse garments of Silke or Bombace [cotton] or of purple: also of Martyn or Wolfe'-skinnnes, or made of Fox'-skinnnes I suppose to be good for the winter: notwithstanding in the time of Pestilence apparell of Silke and skinnnes is condemned because it doth easily admit and receive the contagious ayre and doth retain it long."

Clothes philosophy was, for the first time, put upon a sound footing

towards the end of the last century by Count Rumford, after a series of shrewd experiments upon the relative values of clothing materials. At that time the wearing of what would now be considered underclothing appears to have been unusual, so far as may be judged by the surprise expressed by Rumford that so few people then wore flannel next the skin. Linen was the ordinary wear, and must, in the absence of flannel beneath, have furnished body-garments in general, for there is Adam Smith's contemporaneous testimony that "a creditable day-labourer would be ashamed to appear in public without a linen shirt, the want of which would be supposed to denote that disgraceful degree of poverty which, it is presumed, nobody can well fall into without extreme bad conduct." There is no reason to think that the publication of Rumford's researches produced any effect whatever upon the habits of the people, and it is certain that, so far as his conclusions were concerned, little attention has, until recent years, been paid to them. Mattieu Williams went so far as to declare, not long ago, that the whole amount which the science of the current century has directly added to the work of Rumford is so small as to be almost contemptible. For this neglect there may have been some excuse in the utter indifference with which underclothing was so long regarded. But there is, at any rate, no lack of interest in the question now, either as regards precept or practice. Information upon the laws of heat and moisture, and their relation to fabrics and physiology, can be obtained without any difficulty, and there are numbers of garments specially designed to assist and carry on the work of the skin, which are so smartly pushed, so freely bought, that the use of underclothing bids fair to become general, not only for the sake of warmth in colder seasons, but all the year round. For those who look upon health and wealth as synonymous terms (as, indeed, in literal truth they are), there is ample choice of "right" fabrics, as Mr. Ruskin would call them, providing always that desire is coupled with wealth (in the ordinary acceptance of the word) sufficient to afford them. It must be said, after acquaintance with many price lists, that this latter qualification is, in many cases, one of considerable consequence. But it is doubtful whether any one of the fabrics provided for underclothing has yet, in point of years, attained its majority—which is something to be wondered at, considering how many there are of them—while almost all are still in manufacturing infancy. It is not difficult to imagine the

future historian thinking that there must be some social significance in this sudden solicitude about skin clothing, and setting to work to ascertain the full extent and cause of it. In the contentions which rage continually between the various systems and fibres and stuffs—no disrespect being intended to any of them—the task would be, after a lapse of years, anything but a pleasant or an easy one.

Not with any view of relieving the perplexities of the unhappy historian to come, but only for the purpose of arriving at some knowledge of the spread of this textile movement, brief and indiscriminating particulars may be furnished of the different materials at present in course of manufacture. Each being taken as a factor in underclothing reform, a rough estimate of its development can be arrived at, and that must suffice until more exact returns are available. Few are the persons who would be prepared to find such a number of underclothing fabrics as commerce can offer. To the making of ordinary knitted or woven woollens, under distinct and seductive titles, there is no end; but there is astonishing variety besides. Sybarite or Stoic—as stoicism goes nowadays—can be suited in a double sense: the one with lightest and softest silk, daintily finished and trimmed, and the other with flaxen fabrics, which are, however excellent in utility and intention, not always to sight and touch inviting. There are also all possible combinations—again in more senses than one—between the leading textile fibres and some that are not textiles at all. One speciality on sale in the United States is a close-fitting costume of perforated buckskin, of which an illustration to advertisements is delightfully suggestive of the spotted savage of popular shows. Some undergarments, in absolute defiance of the laws of health, are still made of impermeable chamois leather or kidskin. In a temperate and variable climate all clothes of skins are traps for the unwary—costly furs and many precedents notwithstanding. For “perennial suits” of soft-dressed leather, such as George Fox made and Carlyle magnified, and such as our poorer forefathers commonly wore, there is not a good word to be said; but sealskin sacques are little, if any better. If people must wear furs the skin should be worn outside, just as the Cossack wears his sheepskins; but, climatic differences being taken into account, sensible people should not only turn their furs inside out, but so far improve upon Cossack practice as to perforate all their furs, plentifully, for the sake of free ventilation. Upon this principle is another American

novelty fashioned. It is a close textile imitation of sheepskin, described by its inventor as "a fleecy wool surface knitted into a cotton framework, resembling in many essential points a natural sheep's pelt." The woolly side of the fabric is to be worn next the skin. One other invention for our American cousins is a fine two-fold fabric, produced in wool, worsted, camel's hair, lisle thread, or silk, and in each material in lighter or heavier weights to suit the seasons, but in all providing, by the doubled material, what is called the "Ventilated Inter-Air Space Clothing." Yet another notion, which is as yet confined to the States, is silk sponge, a cheap and coarse fabric made from short combings of silk, and apparently intended for kitchen towelling, rather than for the inner "rind of man," but, for all that, having all the virtues and advantages of pure silk.

On this side of the Atlantic there are varieties in underclothing almost to profusion. Disregarding those woollens which are mainly remarkable for the names bestowed upon them, precedence may be granted, because of its cheery arrogance of title—but on that account only—to the "Underclothing of the Future," a double-woven fabric of recent introduction, in which the underlayer is of wool and the upper surface of either silk or cotton, as circumstances or purses may require. Another novelty which is not without assurance of designation is the "Net of Health," an open-meshed fabric made in wool or cotton. There are garments to be procured which are said to be made from a fibre which "generates electricity upon the skin," the kind of fibre used being left open to conjecture, and other articles are advertised as "electrized" underwear. Great virtues, preventive and curative, have been assigned to a fabric made from fibres obtained from the shed needles of fir trees, mixed with a certain quantity of cotton or wool for manufacturing facility; but the material has, perhaps, hardly been in such general use as to take rank among accepted underclothing. "Cellular" fabrics, which are self-descriptive as regards construction, are made in cotton, silk and cotton, wool, silk and wool, all silk, and lisle thread; and hemp or oakum would doubtless be made to furnish good garments on this principle, if those fibres became popular. Dr. Lahmann's "Reform Cotton Wool" is so far a return to first principles that cotton is treated, during manufacture, like the wool it was supposed to be when imported from the East centuries ago. Cotton-wool was long thought to be of animal origin, and so late as the time of Master Pepys its character was not determined, for there was then

a dispute between "Sir Martin Noell, as Farmer of the Additional Duty, and the East India Company, whether callico be linnen or not: which he says it is, having ever been esteemed so; they say it is made of cotton-woole, and grows upon trees, not like flax or hemp. But it was carried against the Company, though they stand out against the verdict." Popular classifications of cloths are likely in these days to be completely upset by underclothing innovations, for "Reform Cotton Wool," spun loosely, and woven in ribbed and frame fabrics, is as far removed from calicoes and most other Manchester stuffs as Dr. Jaeger's tricot-woven sanitary woollen fabrics differ from flannel. Another "sanitary" material which is, to the truly orthodox woollenite, nothing less than rank heresy, is a flaxen fabric made under the instructions and with the approval of Pastor Sebastian Kneipp, the Bavarian apostle of simplicity and cold water. The cloth which he recommends is called linen, for lack of any other term applicable to flaxen fabrics, but may be fairly described as a bleached stockingette, and is, again, not at all like the compactly-woven linens of common use. Another flaxen underclothing material—which is not "made in Germany," as some others are, but in Ireland—is called "Flaxonia," and this, too, would seem by its structure to be best suited for hosiery. What the "linnen stockings" were like which Pepys bought at the Hague and wore on that occasion when he made himself as fine as he could, will now never be known, but it is quite likely that he was more fine than comfortable, and it is certain that he did not enjoy, as might be enjoyed to-day, the satisfaction of wearing "linnen" almost as soft as silk and nearly as lustrous. But of all underwear at present made, probably the most surprising is a patent hygienic linen underclothing from Cologne, for which the distinguished *imprimatur* of Professor Pettenkofer is put forward. This consists, in the first place, of a "Patent Invigorating Net-Cloth Vest" made of a coarse, wide-meshed net, and intended to be worn next the skin. Over this a "Patent Hygienic Absorbing-Cloth Shirt" is to be put on, made from a material which is still reticular but far finer in mesh. To get into the first garment would seem like putting on a hammock, and the second would have served our great-grandmothers excellently well for the double-ringed net purses which they were accustomed to carry. Like other introductions, this combination of fabrics is roundly asserted to be "the best and most rational system of hygienic under-

clothing for ladies, gentlemen, and children." It certainly affords the strongest possible proof of the onward march of underclothing ideas. A few years ago this patent hygienic linen underclothing, whatever its merits, would have been a wild impossibility.

The man who hesitated before this formidable array of underclothing varieties would indeed be lost. Comparative test of the qualities or values of the rival fabrics would be, for all ordinary folk, out of the question. To pay attention to the special pleadings on behalf of this fibre or to the warnings against wearing that, would leave vacillating mankind without any underclothing at all. "Wool is an enemy to mankind," declares Pastor Kneipp, in capital letters. With all the emphasis of italics, Dr. Lahmann asserts that underclothing made from wool keeps "the skin in a state of permanent excitement, thereby actually increasing the risk of chills, &c., against which it is sought to protect us." Avoid vegetable fibres in any shape or form for clothing and bedding, is the reiterated admonition of Dr. Jaeger. He argues that, while wool and hair have been devised by nature as covering materials for animals, vegetable fibre (linen and cotton) is unhealthy material with which to surround the body, for two main reasons—it is a rapid heat-conductor, and it retains the mal-odorous portion of the emanations from the skin. Animal wool is a slow heat-conductor, and the animals on whom it grew could not have survived if it had retained mal-odorous emanations. Amid this confusion of fabrics and hubbub of voices what is the inexpert purchaser to do? Only this—Obtain the material, whether of single or mixed substance, that best suits predilections and pocket together, and then, so long as it is sufficiently porous as to allow free transpiration of vapour, and sufficiently loose in texture as to detain air in plenty within its interstices, wear it with an easy mind. We are only now beginning to do justice to the clothing value of air. In the "History of Life and Death," by Francis Bacon, Baron of Verulam and Viscount St. Alban, there is a chapter, rather more curious than most others in that remarkable book, "On the Exclusion of the Air." Tacitly approving the use of saffron linen, and expressly commending oiled shirts, he finds baize and woollen linings or carded wool, worn next the skin, better than linen for ensuring the benefit—as he considered it—of "exhausting and drawing the body." For dear health's sake he advocated the free application of unguents, so that the pores of the skin might be closed against "the predatory power of the air," and this

for two reasons: "First, because the outward air, animating the spirits, and being healthful, does, next to the inward spirits, devour the moisture of the body, growing thereby dry and withered; Secondly, by the exclusion of the air, the body being shut and closed, and not breathed forth at the pores, the detained spirits, by their working, soften the hardness of it."

Not so do we now read physiology. Thanks in the first place to Count Rumford, we know that air, as near quiescence as may be, is not capable of conducting heat or giving it passage, "in short, that heat is incapable of passing through a mass of air, penetrating from one particle of it to another." It is, therefore, valuable to the same degree for the maintenance of the heat of the body, and for its protection against chill. A stationary layer of air would hardly be clothing enough, according to our notions of propriety, but Carlyle's Duke of Windles-straw would be warm, in spite of his nudity, if entirely surrounded by air which was quite still and free from disturbance. Any fabric which will hold air enmeshed in its spaces, or within filaments upon its surface, fulfils the first law of underclothing. It may be necessary to interpose additional barriers between warm bodies and outer cold in wintry or boisterous weather, but the sooner people get rid of the idea that thick, close-fitting, or impermeable garments retain heat or keep out cold, so much the better for them. Successive layers of thin material are superior to one equal in substance to all, but superimposed layers of material in any thickness afford little additional protection, if each fits closely. Absolute ventilation must be avoided, so that there may not be an open door left for cold to enter by. Rumford's researches upon the relative conduction of heat by different clothing materials reached their highest point in the following table, which represents the time taken, in seconds, for corresponding quantities of the respective fibres and threads to cool from one temperature to another, on the Réaumur scale. For greater clearness the successive losses are set out in each column, and threads are separated from filaments by italicised figures:—

Heat lost, or amount of Cooling.	Sheep's Wool, Loose.		Woollen Thread wound round Bulb.		Cotton Wool, Loose.		Cotton Thread wound round Bulb.		Lint, Loose.		Linen Thread wound round Bulb.	
70°	—	—	—	—	—	—	—	—	—	—	—	—
60°	79	—	46	—	83	—	45	—	80	—	46	—
50°	95	16	63	17	95	12	60	15	93	13	62	16
40°	118	23	89	26	117	22	83	23	115	22	83	21
30°	162	44	126	37	152	35	115	32	150	35	117	34
20°	238	76	200	74	221	69	179	64	218	68	180	63
10°	426	188	410	210	378	157	370	191	376	158	385	205
Total times	1,118	—	934	—	1,046	—	852	—	1,032	—	873	—

The lesson of these results is obvious. Adopting a phrase used by Ouida in another sense, it is evident that "material is nothing; make is everything."

There is, as regards retention of heat, a slight difference in favour of wool throughout this table. But this depends upon a stability of structure which it is difficult, and almost impossible, to maintain so long as washing of garments is necessary, imperative. The tender mercies of the washerwoman are cruel, but with all her faults she is at her worst in dealing with woollen under-raidment. It is asserted that wool will felt and shrink under the action of perspiration alone, and there is no reason to doubt it, but the process is facilitated beyond all comparison by passage through a laundry. As the fabric thickens, so it becomes useless as underclothing. It loses the property of arresting heat, and no longer permits the free passage of vapour. According to Parkes, wool has a double absorbent power to either linen or cotton in proportion to weight, and quadruple for surface; it will, under ordinary conditions, hold from 12 to 18 per cent. by weight of water, and if at first perfectly dried, 50 per cent. It does not at first absorb water so freely as flax or cotton, but after saturation is much longer than either in drying. When a woollen under-garment becomes matted after passing, more or less often, the ordeal of the wash-tub, it has all the original wool capacity of absorbing moisture but none of the capacity for diffusing vapour which was at first

bestowed upon it by manufacture, while it becomes a good conductor of heat as it is wetted, and, in a corresponding degree, bad for the wearer. The laundry difficulty enters into a fresh phase when the "excrementitious exhalations" of the skin have to be taken into account. The gospel of physical righteousness is not neglected in our day, but its perfect fulfilment makes frequent change of underclothing an indispensable duty. To avoid all appearance of prejudice, a couple of passages may at this point be put in evidence from an admirable little manual of "Modern Dress," by Dr. F. Frederick Pearse. Underclothing should, he says, be changed under any circumstances at least once a week. "The clothes absorb the perspiration, and if the skin is not frequently washed they become full of the refuse matter poured out on the surface. This causes the wearer to become a source of annoyance to everyone he meets. Besides this, the clothes lose their power of keeping in the heat." On another page it is said that "flannel clothing requires rather more frequent washing than other kinds of dress because it absorbs the perspiration and effluvia from the skin so readily." As Mr. Pearse expressly enjoins the use of woollen underclothing, his opinions are unquestionably as sincere as they are outspoken. This leaves the wool-wearer between the "deil" of a change in the structure of his underclothing "and the deep sea" of the wash-tub. It is necessary, in spite of the "natural" colour (which was never yet seen upon a living sheep), to have woollen underclothes more frequently washed, even though they may not be visibly soiled, while frequent washing, and careful washing, will either gradually or rapidly, but in any case surely, impair their usefulness, and in the end leave them worse than useless.

There is no reason to anticipate that woollen under-raidment will at any time be banished from all wardrobes. Warmth-loving people will still wear it because of its slightly greater initial resistance to the transit of heat and apparent warmth through skin stimulation. Use and wont, established by a monopoly of manufacture during the years in which underclothing reform has assumed prominence, will give woollen underwear a long start of other textile competitors, but when other materials are found to be made on equally sound principles, and these principles are yet more generally understood, vegetable fibres will take precedence, and for three good reasons: Economy, lower prices; Efficiency, no shrinking; and Health.

S. WILLIAM BECK.

The Protective Feature of Underwear

By DR. H. L. DIEMEL



IFE is productive of heat. The chemical changes going on in an average human body under normal conditions generate within twenty-four hours a sufficient amount of heat to raise sixty pints of water from the freezing to the boiling point.

Our body has to maintain an even temperature, which is about $98\frac{1}{2}$ degrees F., hence it has to throw off whatever heat it produces. A complete retention of the heat generated in the body would cause death within a few hours, while a partial interference with its elimination would result in a more or less serious disturbance of health, in accordance with the amount of heat retained.

There are three different ways in which our body loses heat, namely:

- 1st. By Radiation.
- 2nd. By Evaporation.
- 3rd. By Conduction.

This triple arrangement shows the conservative aim of nature; if for any reason the loss of heat through one channel should be interfered with, either or both of the others are apt to increase their activity.

The average loss of heat by radiation amounts to more than 50 per cent of all heat lost. The greater the difference in the temperature of our body and that of the surrounding object, the greater the loss by radiation. Whenever the object surrounding our body, be it air or clothing, ceases to be cooler, as for instance in excessive summer heat, radiation will cease and an increased evaporation will take its place, as shown by perspiration.

Evaporation is favored by dryness and impaired by humidity. The drier the air, the better it is able to withdraw moisture from our skin. While we can stand an amount of dry heat exceeding that of our body by 50 degrees and more, for some length of time, we must inevitably perish if our body should be exposed to the same amount of moist heat. It is well known to all of us that in a dry climate excessive heat is much less felt than in a moist one.

Transplant the summer heat of the in-

terior of California or Arizona to New York and a large increase of deaths from over-heating will result.

Conduction is the third agent for the disposal of our heat. It is favored by a velocity of the air current as well as by moisture. If you moisten a finger and hold it up in the air, it will feel the cold much more than a dry finger held the same way. If you should now open the door and window and thereby cause a rapid current of air, commonly called a draught, the conduction of heat will be greatly increased and you will even be able to tell in what direction the current travels. Hence we suffer from excessive cold the same as excessive heat more in a moist than in a dry climate.

The temperature of the surrounding air, its degree of humidity, as well as its velocity, are subject to frequent and considerable changes.

The latitude, season of the year and time of the day show greater or lesser variations in one or all of the above-mentioned factors. While our body has at its command means of its own to guard against the extremes of climate and season, we resort principally to clothing as the most efficient means of protection.

While it is the aim and purpose of our clothing to surround our body with a temperature less severe and less subject to variations than the one which nature has provided, our clothing should at the same time be so constructed and of such material as will not interfere with a uniform elimination of that amount of heat of which our body has to dispose.

Our clothing consists of several layers. The inner, or underclothing, concerns us principally, as it comes directly in contact with the skin, and if wrongly constructed, is apt to do the greatest harm.

The protective feature of clothing depends mostly upon its air-holding capacity or porosity. A calm layer of air is the poorest conductor of heat, consequently the air held within the meshes of a porous garment will prevent the rapid loss of heat attending plain and smooth fabrics.

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A loosely knitted shawl will keep one much warmer than a smooth one containing the same amount of wool.

It is for this reason that although the fibre of wool and the fibre of flax show no difference so far as the property of conducting heat is concerned, a porous woollen garment will keep the body much warmer than one made of plain and smooth linen, but offers no better protection against the loss of heat by radiation than a porous linen garment of the same air-holding capacity.

The second provision for the elimination of heat is by evaporation. Under normal condition our body loses, through the skin, from two to three pints of moisture in the form of evaporation during twenty-four hours. Since humidity does not favor evaporation, it is important that whatever vapor or water is excreted by the skin should not alone be taken up by such material as we may place next to our skin, but should also be given off or eliminated. Our skin, as well as the air and clothing surrounding it, should be dry.

The property of absorbing and eliminating moisture differs greatly in various fabrics used for underclothing. All authorities on matters of hygiene agree that the absorption as well as the elimination of moisture takes place quicker with linen than with wool, cotton or silk.

Every day's observation will support the above statement. Whatever articles are intended for the purpose of absorbing moisture, as towels and handkerchiefs, are made of linen, and all people engaged in laundry work can bear testimony that linen will dry much quicker than wool.

The defect of wool in the power of quickly absorbing and eliminating moisture is a serious one, and if properly understood would do away with its use for underclothing. A woollen undergarment when first put on will impart to the body a feeling of

warmth and protection, which may continue under ordinary conditions of temperature and as long as the body is at rest. However, if in consequence of impaired radiation of heat, as in summer time, or a greater production of heat as by physical exertion, evaporation should be increased, wool will not be able to absorb the moisture as fast as excreted from the skin, nor will it be able to part with what it may absorb, and in consequence the skin and the air surrounding it as well as the garment itself will be moist, and further evaporation will be greatly impaired. The feeling of oppression which the body experiences under such conditions, and which is due to the retention of heat, those who wear wool next to the skin are best qualified to describe.

As observed before, moisture and velocity of air augment the conduction of heat. If the wet body should under the above conditions be exposed to a draught, a rapid abstraction of heat would at once take place, which would chill the body and which usually results in a cold. It is a matter of daily observation that all those who wear wool next to the skin are very prone to contract colds.

It is obvious that the slow absorbent power of wool renders it the best material for overclothing, especially in humid climates and seasons, where a protection against the atmospheric moisture is required. In this respect the purposes of overclothing are directly antagonistic to those of underclothing; the outer clothing should be a poor, the underclothing a good absorbent of moisture.

It follows, therefore, that a porous linen, having the advantage over all other fabrics of absorbing moisture and eliminating it quickly, should provide for a dry climate around the body, hence will enable us to stand extremes of heat and extremes of cold with comparative comfort.



[Written for the MEDICAL BRIEF.]

Flannel Underwear and Personal Sanitation.

BY CHARLES E. PAGE, M. D.,
Boston, Mass.

The late Dr. James R. Nichols, of Boston, founder of the *Boston Journal of Chemistry* (now *Popular Science Monthly*), was an ardent advocate of the air-bath. "We have made the air-bath a matter of careful study," he wrote, "and wish to call the attention of the readers of the *Journal* to it as a means of securing and preserving health, which is of the first importance. It is impossible for physicians or other individuals of ordinary sagacity to fail to see that a large proportion of invalids and semi-invalids do not bear well the application of cold, or even tepid water to the body. Mankind are not aquatic animals, like ducks and geese; they were not born on or in the water, and Nature never designed that they should be splashing about in that element within the lines of the temperate or frigid zones. There are hundreds of thousands of people of both sexes, in this country, who lead miserable lives, and yet they are not in bed, not, perhaps, confined in their dwellings; they suffer from nervous prostration, from imperfect digestion and assimilation, from worry, from overwork, from the care of households, etc. Now, the air-bath comes to these feeble and physically impoverished persons as a kind and good friend. Nearly all semi-invalids are inclined to sedentary habits, and as the circulation is languid the body in winter is under a persistent chill. In the morning, upon getting out of bed, the clothing can not be too quickly adjusted, as the body is in a shiver, and the air of a cool room is a thing to be dreaded. This is the time for the air-bath, and all that is required is a haircloth mitten and a cool room." A coarse towel, or even the bare hands,

answer a very good purpose for rubbing, but a fair degree of friction will shortly cause a warm feeling all over. The specially squeamish individual is advised to begin with a few minutes of this natural treatment night and morning, and gradually to work up as to length of time thus spent, and the degree of cold submitted to, until finally the body is so "rejuvenated, and the blood so attracted to the surface, that the cool air is felt to be a luxury" (Nichols).

Within the past fifteen years the writer has placed the greatest stress on his prescription, forbidding the wearing of under flannels, and he has induced a great many individuals to adopt his theory of dress. Old men and maidens, robust and frail persons of all ages, occupations, social position, from the washerwoman to the daintiest society girl, and from the day laborer to the swell club man, and during almost every month of the year have given up underwear so far as relates to the ordinary flannel suit, and, in every instance, to the comfort and well-being of the patient.

"I bless the hour that I absorbed your theories (of dietetics and personal sanitation)," writes a New York merchant. "The knowledge you have given me is priceless, and has saved me many an hour of pain and sickness. It has, indeed, brought me from ill condition to a physical state, well nigh perfection." This gentleman has worn no inner suit for several years, and his dress shirt, like my own, is of the lightest linen mesh, not unlike fine mosquito-bar goods.

"I would not sell my knowledge of your colds, theories, and views on personal hygiene for a great deal of money," wrote a Haverhill banker. "It has made me my own doctor—showed me how to get well, and keep well."

"I consulted you in the case of my wife," said one of our leading politicians, "because of your article a few years ago in the *Popular Science Monthly*, on 'Catching Cold.' It seemed



to let daylight into all my troubles. I may say that I never have any colds nowadays. I found that the lighter flannels I wore the better I felt, and the less colds I had, and finally I gave them up altogether."

It is my firm belief that if all the flannel underwear of all civilized nations was annihilated, and nothing in the way of substitution practiced, the general health would be thereby vastly improved, and the death-rate lessened by a large percentage. It seems to me that there is no escape from this conclusion, if any weight is to be attached to the history of the aborigines of Tasmania and California, and to the experience of individuals like Captain Von Schmidt, and the scores of consultants and personal friends of mine whom I have induced to adopt this reform measure in dress.

"I owe you a debt of gratitude for your colds theory if for nothing more," wrote a New York banker a short time ago. "I only wish that I was as well informed on all points relating to personal hygiene."

And yet, so universal and deep-rooted is the popular error in this matter that the editor of a great daily, on the last day of April, indites an "editorial note" as follows: "Even if the weather tomorrow is a good deal warmer, the Queen of May will do well to keep her winter flannels on." And this in face of the fact that the newspapers had recently chronicled the unhappy fate of many hundreds of persons who died of "sunstroke." "Overcome with the heat," said the head-line. Who shall doubt but that these poor wretches, flannelled from neck to heels, as they doubtless were, to "protect" them from sudden changes, would have escaped all inconvenience from the heat had they been clad with a pink ribbon about the neck, and an umbrella, solely, or as near that as the law would allow?

The late Dr. Dio Lewis, who said so many good things, and wrote so much and so wisely on hygienic themes, somewhere told a pretty little story, which he vouched for as strictly true, of a dear little girl friend of his, who was very frail and delicate, and a cause of great anxiety to her parents and friends. He was calling at her home one day, and she took him out into the garden to show him some beautiful flowers. While expressing his admiration, a thought struck him as to a means of impressing an important truth on the minds of the little girl's parents. "How do you think this little flowering plant would look in a pretty little gown?" he asked. She laughed at the idea, and when he urged it seriously, she agreed to make a dress for the plant, something like her own, including underwear, a project which she carried out to the letter. He called again a few weeks later, to find his little friend in mourning; for her over-protected flower was like herself, evidently "in a decline."

Through this experiment he was enabled to so impress the minds of the parents, that they gladly agreed to give her air-baths, morning and night, and to keep her nude as much as practicable throughout the entire daytime. A high fence was built that she might walk in the garden nude, and she spent several hours every day, nude, at work over her plants. Before the summer was half gone, it was plain that the treatment was a success. To make a long story short, this little girl, through plain diet, and nothing to wear, grew robust, and out of all danger of decline.

Who, to-day, has not heard of the Kneipp barefoot cure? Woereshoffen, Bavaria, has for several years been the Mecca for sick and ailing persons of all social positions who could manage to go there. Princes, princesses, and no end of people of "quality," including Baron Rothschild, have been patients of the

old parish priest, who for the past thirty years has treated the sick poor of his parish without fee, and with such marvelous success that his fame has spread throughout Europe, and, in fact, the world. To see scores of his wealthy and distinguished patients trooping barefooted and barelegged through the wet grass for several hours in the morning might seem, to the uninitiated, as if some neighboring asylum for the insane had let loose its wild men and women; but these people are in their right mind, and Fr. Kneipp has set them right, and they get well of their diseases. The abandonment of flannel underwear, the practice of taking air-baths, of going much of the time barefoot, together with simple diet—these are the remedies which have wrought the miraculous cures that have been so much talked of.

The Empress of Austria consulted an eminent doctor for her terrific neuralgia, and it so happened that he had caught on, so to say, to the barefoot idea. At his bidding she spent several hours every morning walking barefoot through the dewy grass about the palace grounds, and a few days of this natural treatment ended her terrible sufferings.

The family doctor of the Premier of England has been wise enough to introduce this treatment in certain cases, and little Dorothy Drew, Gladstone's grand-daughter, was made over new, from a puny little wretch she became a healthy, robust child, through going barefoot all the year round, except in the severest cold and muddy weather.

The writer's four children are never shod, winter or summer, except when on dress parade, or out of doors in winter. Our four year old boy and six year old girl have frequently, in pure roguishness, run out in the snow, during the past winter, for a few moments, to

rush back with feet red, full of blood, and in a warm glow, and no anxiety has been occasioned thereby, except to ignorant onlookers.

No one proposes for the human race to resume its normal nakedness. We must be draped in public; and, indeed, from every motive, even including that of grace and beauty, it is doubtless well for us to be clothed. But the thing is to use clothing, and not abuse it; that is, no more than law and social custom compel. The rule should be to have the clothing light and loose, the weight borne by the shoulders. As we have already indicated, the indoor dress should be about the same winter and summer, so much of the time being spent indoors in winter, in warm rooms, where it practically is perpetual summer. In practice it transpires that the less one wears indoors the less extra wraps he requires for comfort when he goes out in cold weather. The skin acquires a robustness, so to say, as does that of the Indian or other naked races. The Indian sneered at the pale-face's coddling wraps: "Indian's body all face," he said.

Dr. Oswald tells of a capture by the Indians out West, of one of Gen. Sheridan's supply trains. A large lot of army trousers were taken, and every buck Indian donned a pair; but they cut out the entire seat in every instance for local coolness and comfort. What a contrast this is to the local "sweat pack" of the average man's dress, with the overlapping of two shirts, one of heavy flannel, heavy flannel drawers, trousers—friction and heat where, of all things, should be entire freedom from both. Every physician should be able to judge of the mischief necessarily arising from this unphysiologic state of things!



A DISSERTATION ON WOOL

Women Who Would Be Beautiful
and Who Would Be Comfort-
able Should Consider It.

NO WOOL NEXT THE SKIN

That Is What Dr. Lesser of the Red
Cross Believes, and He Gives His
Reasons—Sometimes Overheat-
ing, Not So Clean, and
Not Easily Sterilized.

N.Y. Times — May 8 1898

The woman who wants to be beautiful and has progressed far enough to know that she can't be beautiful unless she is healthy and has been suffering with an irritating woolen garment next her skin all Winter can discard it now and forever, if she likes to take the advice of Dr. A. Monae Lesser, Surgeon in Chief to the National Red Cross.

Dr. Lesser disclaims being an authority upon the subject, and expresses due deference to the opinions of others who have made a study of the matter, but he has given it considerable thought, and the result of his investigations and experience has been that wool should never be worn next the skin.

That is what he has told the Red Cross nurses who may go to Cuba, and they will all take undergarments of either cotton, linen, or silk. Any one who goes there with woolen garments as a preventative against infectious diseases or as a help in becoming acclimated, he says, with a little laugh, will soon see the error of their ways. Dr. Lesser has made a study of the Red Cross methods in times of famine, calamity, and war, and from all deducted what experience has proved to be the most satisfactory. He has spent five weeks in Cuba recently, where he made a special study of the climate, diseases, and the dress of the people, so that he was prepared to

tell the Red Cross nurses what he considered would be the most hygienic wearing apparel.

It was in connection with this that Dr. Lesser answered a few questions put by a TIMES reporter concerning not only underwear to be worn in Cuba, but by people of the United States at all times.

"Is there less danger of taking cold in Cuba than here?" asked the reporter.

"Yes," said Dr. Lesser, "for the temperature is more equable. In the warm season the heat is continuous, though the nights are a little cooler than the days. The people of Cuba wear loose garments of cotton or linen. This looseness of the clothing is essential to allow the process of evaporation to take place between the body and the clothes, but it is well to have the garments clothing the lower limbs brought closely into the top of the stocking, on account of insects which might make life miserable.

"The children in Cuba illustrate the fact that it is a warm country, where as little clothing as possible should be worn. It is a frequent occurrence to see children up to ten and twelve years of age, particularly in the country, entirely naked.

"But would not woolen prevent stomach troubles, to which a person might be subject in a changing climate?" asked the reporter.

"Stomach troubles come from within, so to speak, not from without," answered Dr. Lesser, "though trouble might be caused by the body being chilled suddenly. A certain even temperature of the body must be preserved. In a hot country the surface blood must be cooled to be returned to the inner part of the body to preserve this even temperature. If the surface blood is not kept reasonably cool the general temperature is going to be raised abnormally. We do not have sunstroke from the effects of the sun alone. We can have a sunstroke from the effects of the intense heat of a room, therefore it is only reasonable to suppose that the body should not be heated by unduly warm clothing."

"And you do not think that woolen clothing should be worn next the skin at any time?"

"Wool next the body is apt to be irritating to the skin, and it is relaxing to the blood vessels. It is true that wool is absorbent, but it is also well known that wool containing some oily substance has not the absorbent qualities of linen or cotton. There are always people who claim that they have wool without oil, but it is also known that wool without oil is almost useless for manufacturing purposes. It is the oil that makes it soft and pliant. Take a woolen garment that has been poorly laundered. It is stiff and hard and unyielding. That is because the oil has been washed out of it.

"A person who wears wool next to his skin will not have as clean a skin as a person who wears linen or cotton. Then

you will find disease originating more frequently through woollen underwear than linen or cotton. A woollen garment will absorb germs as it hangs on the line in the process of drying. Linen and cotton will not as readily. Did you ever think that woollen garments cannot easily be sterilized? You boil linen or cotton, but never wool. Woollen underwear cannot be sterilized except by washing in naphtha or strong disinfectants, and that is not likely to be done by any one but a doctor who has been attending a patient with an infectious disease.

"Linen or cotton is pleasant and agreeable to the skin. Go through Germany and you will find but little else worn. Warmth can be regulated by the thickness of the clothing, though there is more warmth in a certain weight of wool than in the same weight of cotton or linen. I believe it is possible, by the regulation of the outer clothing, to maintain a healthy condition of the body. The nearer the approach to the extremities the more warmly the body should be clothed. In Winter a woollen undergarment can be worn over another one, a little undergarment of the finest cotton of some kind. That is what I should advise. It is natural for the body to perspire, but a profuse perspiration from overheating is not a good thing. There should be a free outlet for it at all times. If wool possesses such absorbent qualities why do you not have your bath towels of wool? That is something you would not think of doing.

"There is no objection to a wool bath robe, and the only place where I should consider wool really valuable, or where there is an argument in favor of it, is in a rain.

"While an undergarment of the ordinary fine cotton cloth is advisable for Winter wear, it is better, perhaps, to have the cotton garment to be worn in the Summer of a woven material, (stockinette,) as it is more absorbent. Wool for an outer garment may be better in Summer when one is exposed to the rays of the sun, as it is a non-conductor of heat.

"Have you known women who have given up wearing the wool for cotton or linen?"

"Yes, hundreds of them who were troubled with an irritation of the skin and rash which the wearing of different underwear overcame. The only thing to remember is that the body must be kept at an equalized temperature, the surface blood kept sufficiently cool in Summer to temper the inner heat.

"And babies? Certainly none of the babies that I have anything to do with wear anything but cotton or linen in shirts or bands, only a little woollen sack on the outside. It is all a matter of custom. Why should not the baby be accustomed to wear as light clothes as possible to make it comfortable through life?

"These are all matters of habit, and we must accustom the body to changes, which may occur, by training it. For instance, a

person who dally bathes in cold water and walks for an hour in a wet bathing suit will not be inconvenienced by being caught in a rain. That, perhaps, would not be possible in a house, but it can be done when a sea bath is taken. I know people who make a practice of doing it.

"A cold bath every morning will do much to accustom the skin to changes. I know a man who plunges into ice water every morning in a room with the windows open. Such a man will not be affected by changes of temperature. Yes, and what a man can do a woman can do. A person who is not accustomed to a cold bath must begin mildly. When the body has reached its full development it is not so easily trained to new habits."

"What would you suggest?"

"I have always advised the following methods for beginning the cold bath. First wash the hands, for they must be clean. Then with the hands wash the arms and shoulders and under the arms, then the face and neck, and gradually on down the back and chest and limbs. Be sure to wet the entire body by repeated applications of water and dry with a towel that is not too rough. There is no danger of taking cold, for the body is in motion all the time. This can be followed after a time with a bath with a wash cloth, though I always favor the hand. People who bathe the face and neck in cold water will not need to protect the neck with scarfs and furs.

"After becoming accustomed to it a shower or plunge bath is beneficial, but

not unless it leaves a comfortable feeling of warmth. There is no danger in any one taking the plunge or shower bath who has not kidney trouble or any disease by which the heart action is impaired. The age of the person is immaterial. It makes no difference how old people are if they have become accustomed to bathing."

"Are not women who go about in light muslin gowns in Summer, with only a thin covering over their arms and necks, endangering the health?"

"No, not if they have accustomed themselves to it. You know the story of the Indian who, when he was asked why he could go with so much of his body exposed to the outer air, answered that, as the white man did not feel the cold in his face, so he did not feel it because he was all face. I presume we could go without clothing entirely if we were accustomed to it, though the skin under such conditions would be quite different from our skin as it is now, made tender by protecting clothes. The great trouble with us is that we live in a climate where there are constant changes from heat to cold. But we can accustom ourselves to reasonable changes of temperature by not keeping always in rooms of a like degree of heat and not feeling obliged in cold weather to put on a thick wrap for every little run into the open air."

Dr. LAHMANN'S } OR { Dr. JAEGER'S COTTONWOOL ? } SHEEPWOOL ?

The following Letter appeared recently in "The Herald of Health." The next number brought an answer to it signed DR. JAEGER'S SANITARY WOOLLEN SYSTEM COMPANY, Limited, which, in its turn, was answered by DR. LAHMANN'S COTTONWOOL UNDERCLOTHING AGENCY, 15 FORE-ST., E.C., who will be pleased to send gratis and post free a reprint of all the three letters to any reader of THE NEW REVIEW, together with Price List, Cuttings, and Testimonials from HOME, from INDIA, and from CANADA.

To the Editor of "The Herald of Health."

I owe so great a debt to the *Herald of Health* that I have often wished for some opportunity of repaying part of my obligation. Such an opportunity seems now to present itself.

The superstition of "woollen next the skin" possessed me for half a century. Others, including the most ardent food reformers, labour under a like delusion. I have been a slave to all its forms: flannel, coarse and fine; the best Scotch wool vests; and, finally, Dr. Jaeger's shirts. A year ago the notion of casting off my flannels would have seemed to me madness. However, I read about Dr. Lahmann's reform—the substitution of a special kind of cotton that did not shrink, did not thicken, and did not chafe or stimulate the skin; did not absorb, and was always clean. At first I wondered; but I could not resist the reasoning. I knew from sad experience how the most perfect woollen fabrics shrink, and form a hard, felty mass, more like leather than a soft garment; and how they take up the perspiration, and become redolent of cast-off humanity. I was charmed with the notion of a shirt that would not absorb sweat and other excretions of the skin, as wool does, but would transmit them to the outer air, so that a cotton of this open texture is cleaner after seven days' wear than wool after seven hours'. This is the theory. I resolved to submit it to the test of practice, and ordered two of those special shirts from the

Lahmann Agency. They came down by return of post. It was one of those very hot days we had in early June, thermometer 85° in the shade, and 100° in the sun. I had been out for a walk, and returned at midday with my flannel in a soppy state. Finding the parcel on my table, I took a copious shower-bath, put on one of the shirts, and felt more comfortable than ever I did in my life; walked out again in the afternoon, and felt no oppression. Next day the thermometer fell 30°; this was a severe test; but felt no chill. The day after we had rain from morning till night. The climate is very variable here, but in sunshine and storm, for more than three months, I have felt the comfort of my new clothing, so that I have ordered a complete set of underclothing of a thicker make for the winter.

Lest it should be thought the writer has any interest, direct or indirect, in the Lahmann enterprise, I give my name and calling.

I know nothing of Dr. Lahmann or his work, except what I read in his prospectus and enjoy in the use of his appliances; and I have written this that others may derive the same benefit from them as

Your obliged servant,

T. A. CROWTHER, D.D.

The College, Dumfries.

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